IN THE CLAIMS:

1. (cancelled)

2. (cancelled)

3. (cancelled)

4. (previously presented) A method of operating a magnetic resonance imaging system having a first coil and a second coil to achieve an imaging volume, said method comprising:

in a first mode, achieving the imaging volume by using a sum field from both of the coils; and

in a second mode, achieving the imaging volume by using a difference field from both of the coil,

wherein P1 and S1 are primary and shield radii for the first coil, P2 and S2 are primary and shield radii for the second coil, and P1<P2<S1<S2, said method comprising achieving the current density for a small imaging volume coil by assuming that the primary and shield radii are P2 and S1 respectively and denoting the current density by D1.

5. (original) A method in accordance with Claim 4 further comprising achieving the current density for a large imaging volume coil by assuming that the primary and shield radii are P2 and S2 respectively and denoting the current density by D2.

6. (original) A method in accordance with Claim 5 further comprising denoting the initial current density for coil C1 by E1 = 0.5 * (D1 + D2).

7. (original) A method in accordance with Claim 5 further comprising denoting the initial current density for coil C2 by E2 = 0.5 * (D1 – D2).

8. (cancelled)

9. (cancelled)

10. (cancelled)

11. (cancelled)

12. (cancelled)

13. (cancelled)

14. (previously presented) A magnetic resonance imaging (MRI) system comprising:

at least one first coil; and

at least one second coil electromagnetically coupled to said first coil;

said imaging system configured to:

operate in a first mode to obtain a small imaging volume by using a sum field from said first coil and said second coil; and

operate in a second mode to obtain a large imaging volume by using a difference field from said first coil and said second coil;

wherein P1 and S1 are primary and shield radii for said first coil, P2 and S2 are primary and shield radii for said second coil, and P1<P2<S1<S2, the current density is achieved for a small imaging volume coil by assuming that the primary and shield radii are P2 and S1 respectively and denoting the current density by D1.

15. (original) A system in accordance with Claim 14 further comprising achieving the current density for a large imaging volume coil by assuming that the primary and shield radii are P2 and S2 respectively and denoting the current density by D2.

16. (original) A system in accordance with Claim 15 further comprising denoting the initial current density for coil C1 by E1 = 0.5 * (D1 + D2).

17. (original) A system in accordance with Claim 15 further comprising denoting the initial current density for coil C2 by E2 = 0.5 * (D1 – D2).

18. (cancelled)

19. (cancelled)

20. (cancelled)

21. (currently amended) A method of imaging an object utilizing a magnetic resonance system, said method comprising:

imaging a first volume using a sum field from a first coil and a second coil; and

imaging a second volume using a difference field from the first coil and the second coil, including reversing the magnetic field of the second coil to switch from the sum field to the difference field,

wherein a field for the first imaged volume is B1, and a field for the second imaged volume is B2, a field from the first coil is denoted as C1 and a field from the second coil is denoted as C2, said method comprising selecting C1 and C2 such that C1 + C2 = B1, and C1 – C2 = B2;

~~A method in accordance with Claim 20,~~ and further wherein P1 and S1 are primary and shield radii for the first coil, P2 and S2 are primary and shield radii for the second coil, and P1<P2<S1<S2,

~~said method~~ and said method further comprising achieving the current density for the first imaged volume coil by assuming that the primary and shield radii are P2 and S1 respectively and denoting the current density by D1.

22. (original) A method in accordance with Claim 21 further comprising achieving the current density for the second imaged volume coil by assuming that the primary and shield radii are P2 and S2 respectively and denoting the current density by D2.

23. (cancelled)

24. (cancelled)

25. (cancelled)

26. (previously presented) A method in accordance with Claim 7 further comprising transforming a current density for coil C2, at radius P2, to radius P1, such that an internal field of coil C2 is unchanged.